

**IMPLEMENTATION OF PLANS OF WORK (POW) 2002-2004
UNDER THE AGRICULTURAL RESEARCH, EXTENSION, AND EDUCATION
REFORM ACT OF 1998 (AREERA)**

**2002 ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS
University of Arkansas at Pine Bluff**

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**IMPLEMENTATION OF 5-YEAR PLANS OF WORK (POW) 2002-2004
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REFORM ACT OF 1998 (AREERA)**

ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS

INTRODUCTION

The School of Agriculture, Fisheries and Human Sciences at the University of Arkansas at Pine Bluff (UAPB) includes three academic departments (Agriculture, Aquaculture/Fisheries, and Human Sciences), the 1890 Research and Extension programs and the Aquaculture/Fisheries Center of Excellence. Research faculty are integrated into the academic units in agriculture and human sciences, while Extension personnel are under the direct supervision of associate Extension administrators. The Department of Aquaculture/Fisheries and the Aquaculture/Fisheries Center of Excellence are administered by a department head who is also the center director. Under this structure, academic faculty are integrated into the functions of the center of excellence through joint appointments that include academic, research and/or Extension functions.

These structural differences require concomitant difference in the structure of the institution's POW and in its annual reporting documents. Research and Extension programs in Agriculture are conducted in the areas of plant science, horticulture, animal science, and agricultural economics. The efforts of the Department of Human Sciences are directed towards human nutrition, food safety, and family life. Consistent with the university's five-year POW accomplishments in these areas are presented in Part I of the report – Agriculture, Family and Community Programs. Accomplishments in Aquaculture/Fisheries research and Extension are reported in Part II of this report.

All research and Extension programs at UAPB are designed and implemented to provide needed assistance and information to the state's Aquaculture industry, small-scale and limited-resource farmers, and disadvantaged families and youth. These programs have expanded greatly since their inception (research in 1967 and Extension in 1971). Greater responsiveness to clientele needs has resulted from CSREES formula funds and the AREERA mandated state matching funds.

The CSREES review of the institution's FY 2001 Report of Accomplishments – though most complementary to the work of and results in the Aquaculture Center – included two required improvements in the Agriculture, Family and Community programs. These were

1. Establish formal stakeholder input process
2. Expand impact statements to reflect outcomes

In response to these directives, the university submits the following comments:

Establish formal stakeholder input process

Our FY 2000 5-Year Plan of Work described a stakeholder input process that, in light of structural differences in the departments and differences in audiences served, varied across departments and programs. This approach was taken because the clientele needs for research and Extension – in programs other than aquaculture – are commodity specific, local in nature and geographically limited. While the Aquaculture Program provides research and Extension support for all aquaculture producers in the state, other programs support under-served and diverse audiences in a limited number of counties. A county-based stakeholder input process as suggested by the reviewer is of limited value to our program because, unlike most Extension organizations, UAPB has never had county-based programs or staff. Our specialists in agriculture, family and community programs work with 1862 county agents, as requested, or organize clientele groups through community-based organizations, schools and the faith-based community. With this structure, it is virtually impossible to develop the type of process recommended. In all cases a single county is likely to benefit from only a single program area. Consequently, our initial stakeholder input plan required each program to develop its own input mechanism depending upon the nature of the program and the targeted clients. While we will address, as best we can, the required improvements delineated in the review summary, the university remains secure in its decision to vary stakeholder input methods by program area and asks that CSREES allow the university some latitude in structuring stakeholder input processes to meet the personnel, program delivery modes, and structure of the Extension program; and the needs of specific program areas. The stakeholder input description presented in this report is modified to define parameters within which acceptable methods for achieving stakeholder input are achieved.

Expand impact statements

Considerable effort has been made to expand impact statements beyond the reporting of inputs and activities. Terry Meisenbach of CSREES conducted a one day workshop with UAPB research and Extension faculty in January, 2003. The impact of this workshop is reflected in the individual accomplishment reports provided.

REVISED STAKEHOLDER INPUT PROCESS

The personnel structure and program delivery modes of the various 1890 Extension programs require some latitude in prescribing stakeholder input processes. Stakeholder input has always been a core component of the planning and implementation of research and Extension programs at the university. This commitment continues. Although various program units are allowed to develop stakeholder input processes that fit their personnel, program delivery methods and clientele, the following minimum requirements are established for any program area to meet the stakeholder input mandate:

1. Some formal mechanism shall be established to garner stakeholder input into the planning and implementation of any new research or Extension program. Such formal mechanisms may include –
 - a. Area wide focus group meetings in the geographic area of the targeted program.
 - b. Structured survey of potential audience, commodity groups and other stakeholders.
2. An annual process shall be established to garner stakeholder input into the continued implementation of all ongoing research and Extension programs. Acceptable means of annual stakeholder input include –
 - a. Advisory committees composed of all relevant stakeholders.
 - b. Program task forces or coalitions that include program participants and community-based partners.

Results of initial stakeholder input shall be incorporated into the justification or need for the program section of all new research or Extension proposals. Annual accomplishment reports shall include the results of stakeholder input into ongoing programs as well as indications of how the input impacts program planning for future program activities and delivery.

The appropriate department heads and associate Extension administrators shall ensure that the requirements for initial and continuing stakeholder input are met.

MERIT REVIEW

Merit review is central to the university's goal of implementing quality programs that make a difference in the lives of people. Both research and Extension programs are monitored through the annual performance appraisal system to ensure adherence to this goal. Additionally, each department – Agriculture, Aquaculture/Fisheries, and Human Sciences – historically conducted separate reviews of research proposals prior to their implementation. However, a new school-wide system for merit review was implemented in FY 2000. The system expands the current research peer review system to require a periodic external merit review process for all programs, as well as a school-wide peer review of all research proposals. A new component of the performance appraisal process (conducted annually) clarifies expectations for scientific productivity for research faculty.

Merit review in Extension programs includes inter- and intra-institutional assessments of program quality prior to the initiation of new programs and an annual review of program accomplishments during the annual performance appraisal process. Additionally, all programs are required to undergo an external merit review every three to four years either via a CSREES

review or by external evaluators invited by university administration. Each department or unit head is required to facilitate the review process.

A review team of four research and Extension scientists from out-of-state universities conducted a peer review of the aquaculture/fisheries program in November of 1999. The Extension program in Family and Youth Development was reviewed by an external team in FY 2000. Both reviews were very positive and provided excellent input into program directions. The Agriculture and Human Sciences research programs and Extension agriculture programs have been approved for CSREES review in FY 2003.

**OVERVIEW OF RESEARCH AND EXTENSION PROGRAMS REPORTED
IN THE 5-YEAR PLAN OF WORK BY GPRA GOALS**

Function	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
1890 Research Programs	1. Poultry Production and management ¹ 1. Crop protection systems 2. Alternative crop production 3. Catfish production and management 4. Baitfish production and management		5. Herbs and vegetable production 6. Human nutrition and health ¹	7. Integrated pest management 8. Small ruminant nutrition/management	9. Economic behavior of minority farmers 10. Improving quality of life
1890 Extension Program	1. Small farm/ Horticulture management 2. Livestock management 3. Catfish production/management 4. Baitfish production/management	5. Nutrition education and wellness system (Food Safety)	5. Nutrition education and wellness system (Diet and Health)	6. Farm pond management and irrigation reservoirs	7. Family and youth programs Young Scholars •Adolescent pregnancy prevention •Parenting education •Child care training

¹Terminated

ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS — POW
October 1, 2001 — September 30, 2002

Part 1 — AGRICULTURE, COMMUNITY AND FAMILY PROGRAMS

Goal 1 — An agriculture system that is highly competitive in the global economy

Executive Summary

The agricultural research and Extension program at UAPB supported three research programs, and two Extension programs under National Goal 1. These programs all had the common component of applicability and service to the small- and limited-resource farmers. However, the results or impacts of these efforts are not restricted to small and limited producers. Alternative crop production, management, and marketing systems that are highly competitive in the global economy and the development of farmer skills that will help them manage traditional enterprises competitively in the global economy are projected outcomes.

Research program 1 invested aspects of crop production system that could lead to reduced cost of production, such as the use of resistant cultivars, incorporation of none-restrictive pesticides, and early planting methods. Crops utilized in these studies are crops that many small and limited resource farmers are now producing (tomatoes and leafy greens). Research program 2 is integrated research effort that combines plant breeding, crop production, and economic feasibility studies to support our efforts in evaluating alternative crops for small and limited-resource farmers. Economic feasibility analysis of production systems for southern-pea, leafy greens, and sweet potatoes are central to this research program. The plant breeding aspect is limited to southern-pea. The goal conditions utilizable by limited resource farm practices. Production research is attempting to devise production systems that require lower inputs such agricultural chemicals and the manipulation of planting dates and seeding rate to obtain a better profit margin.

Extension program 1 is directed toward family farms and the small and limited-resource farmers. The research conducted is designed to support Extension activities that include training small acreage growers in economical, management, and cultural practices needed for the production of alternative crops. Many of these growers are now in the process of adapting traditional row crop methodology to vegetable and fruit production. Sweet potatoes, okra, and leafy greens are the major crops of emphasis. In addition to research and on-farm demonstration plots, and traditional Extension methods such as information leaflets and newspaper articles are unitized. This integrated research and Extension Program has close ties with 1862 Extension agents in targeted counties.

The Livestock Management Extension Program (Extension Program 2) is directed toward improving the efficiency of small cattle and swine producers. Major activities include assisting small farmers in participating in the Bull Breeding Soundness Exam Clinics (BSE Clinics), 4-H and FFA youth activities. The Livestock Management Program provides agents and producers

with current technical information and best management practices.

Summary of Goal 1 — Program Area Initiatives and Impacts

Goal 1 — Research Program 1 — Poultry production and management

- a. The research scientist conducting this research retired and this project was terminated March 31, 2001.

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Goal 1 — Research Program 2 — Crop protection systems

Key Theme: Other – Pest Management

- a. Brief description of activities — Research Activities in 2002 dealt with evaluating tomato varieties which are resistant to the tomato spotted wilt virus (TSWV). The disease did not appear in the test plot during the summer however yields comparisons were made to the standard varieties grown in commercial production. Plots of greens were also grown and few insects problems occurred early in the season. The Spinach Flea Beetle larva were observed attacking turnips. Large populations of the cabbage aphid occurred late in the fall.

Observations from attempts to establish planting of greens for insecticide testing indicated that some varieties tolerate the August heat better than others. A study was conducted to determine which greens could be planted the earliest in black plastic mulch. The percent of the seed which germinated was estimated from plots 12' long. Each of the 9 varieties was then replanted in the areas where there was no germination 10 days later. The second planting established that the seeds were viable. The “Vates” collard seeds would not germinate in either planting and the seeds were not considered viable.

In order to determine if the non-restricted pesticides can be as effective as the more toxic restricted use one, a test was conducted for three years spraying insecticides on tomatoes and recording the yields. The insecticides used were the non restricted use insecticides and some alternative insecticides. These were a bacterial insecticide, oils and insecticidal soaps. Alternative insecticides were also mixed with insecticides to determine if the efficacy was the same as the insecticides alone. A restricted use insecticide was included in the test as a standard for comparison.

- b. Impact(s) — Last year TSWV resistant varieties were grown along with standard varieties in replicated plots in southeastern Arkansas. A widespread TWSV did not occur nor was the incidence noted in the plots. The level of resistance to TSWV could not be assessed. However, the data showed that the resistant varieties had yields comparable to the standard varieties. Tomato growers who wish to try the new varieties could expect yields comparable the standard varieties. If no TSWV occurs, the only added expense will be for the increased seed costs. If TSWV does occur usually there is a total crop loss.

The turnip and mustard varieties had the highest germination rates with Georgia collards and curly mustards the lowest. Growers attempting to maximize their profits by early marketing should select these varieties for the earliest planting. Early planting of Georgia collards and curly mustard risks wasting seed and labor if there is poor germination. In additional there will be additional expense of replanting later.

Tomato plots sprayed with the mixture of the insecticide sevin and the bacterial

insecticide, *Bacillus thuringiensis*, (BT) had total yields which ranked among the top three highest yields. For the gardener this mix appears to be effective as the restricted use insecticide and would be an alternative to acquiring licensor commercial producers, the additional cost of using two insecticides (restricted use), and the time and effort to become licenced to use insecticides. Yields from plots sprayed with a mix of garlic oil and BT had the highest yields in 2001.

- c. Scope of Impact — All fresh market tomato producers and Southeast Arkansas
- d. CSREES Funding – **\$83,289**
State Matching – **\$27,890**
Other Funding – \$

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Goal 1 — Research Program 3 — Alternative agriculture

Key Themes: Agricultural Profitability, Plant Germplasm, Small Farm Viability

- a. Brief description of activities - Field plot studies that evaluate effects of NPK fertilizer and herbicide use on southern pea yields are being conducting. Enterprise budgets are being developed that can be used to measure increased profit potential of using herbicide for weed control in southern peas. Fall Greens, Broad Leaf Mustard and Purple Top Turnips are being grown under two planting methods (Bed Planting and Non-Bed Planting) to determine the effect of planting methods on yield. Sweet potato variety tests, in-row plant spacing studies and fertility studies are being conducted to determine practices best suited for limited-resource farmers.
- b. Impact(s) — Southern peas are one of the most popular and profitable alternative crops grown by small and limited-resource farmers in the South. However, many of these do not use herbicides and thus have poor weed control. Studies determined that there is economic value in using the herbicide - Treflan (Trifluralin) for weed control. Tests were conducted on two varieties of peas at the UAPB experimental farm in 1991, 2000 and 2001. Yields of peas (fresh pod) were increased from 12 to 17% from using Treflan herbicide for weed control. One a per acre basis yield increases ranged from 17 to 21 bu/A. The level of response to herbicide use was also related to weed pressure in the test plots. Enterprise budgets developed for fresh market southern peas (1999, 2002 and 2001) indicated average returns per acre were \$866.67 for Coronet variety and \$928.32 for the LA Quick-Pick variety.

Average sweet potato yield of 239 Bu/A of US#1 grade and a potential return of \$650/A may be realized by small farmers using production practices applied in this study. Results from two years of field plot test indicate that irrigation and 9 or 6 inch in-row spacing rather than the standard 12 inches will significantly increase both total yield and US#1 grade of sweet potatoes. Reducing in-row spacing of sweet Reducing in-row spacing of sweet potatoes could significantly increase profit for limited resource farmers since the US#1 grade has a higher selling price. The response of Fall greens (Broadleaf Mustard and Purple Top Turnips) to Bed vs Non-Bed planting has been inconsistent.

- c. Scope of Impact — Consider, for example, farmers involved in the Small Farm Project - University of Arkansas at Pine Bluff. About one-third (or one-hundred) farmers involved in this project are growing southern peas. Each farmer grows an average of two (2) acres of peas. Thus, the total number of peas grown by farmers is approximately 200 acres. The economic benefit of growing Coronet is approximately \$173,334 [200 acres * \$866.67 per acre = \$173,334]. The economic benefit of growing LA Quick-Pick is approximately \$185,664 [200 acres * \$928.32 = \$185,664]. The average returns per acre without herbicide—Treflan (Trifluralin) was \$898.51. The average returns per acre with herbicide—\$1,029.92. Thus, the economic benefit of using herbicides could be \$131.41 per acre or \$26,282 for 200 acres of peas grown by small farmers participating in the

small farm project.

Other small farms in the Lower Mississippi Delta region should be able to reap similar per acre benefits from the use of herbicide, Treflan.

This information will be disseminated to farmers via pamphlets and newsletters. The target audience will include: Small Limited-Resource Farmers of the Mid-South, Small Limited-Resource Farmers of Arkansas and Small Limited-Resource of America.

- d. CSREES Funding – **\$197,306**
State Matching – **\$66,067**
Other Funding – \$

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Goal 1— Extension Program 1 — Small farm/Horticulture management

Key Themes: Small Farm Viability, Agriculture Profitability

- a. Brief description of activities — The Extension horticulture specialist in collaboration with 1862 Extension agents developed a comprehensive on-farm demonstration program with sweet potatoes, okra, peas, and leafy greens to teach farmers new emerging production technologies in producing vegetables at lower cost. Families were also taught to compare the benefits of using adaptable hybrid seeds that double average yields, increase profit margin, and have high consumer demand. Production meetings, conferences and agriculture expositions were organized to further reinforce farming knowledge gained from on-farm demonstrations. In addition, collaborative efforts were made with an 1862 Extension economist to organize growers under producer cooperative to deliver a series of programs on how to run successful cooperatives and strategies of reviving redundant producers cooperatives. Extension agents/ associates and the horticulture aide directly participated in the demonstrations along the farmers. Special training sessions were organized to teach farm safety and bookkeeping methods. The horticulture specialist used the 19 local newspapers in southeast Arkansas to disseminate biweekly written columns on alternative crop production, management, marketing and government programs to more than 25,000 subscribers. The same information is written as newspaper articles and sent to state-wide news networks including television, newspaper, radio and regional farm publications.
- b. Impact(s) — The program has increased the land acreage under vegetable production by 15% in Lee and Phillips counties where the volume of fresh produce sold at the Lee County marketing cooperatives increased by more than forty percent in July 2002. The increase in land acreage and corresponding high production capacity added \$320 per acre to the total revenue of average farmers with 5-15 acres in production.

Production and management experience from on-farm demonstrations enabled the small farmers with 5 to 10 average land acreage to increase the state average yield of sweet potatoes from 350 bushels per acre (BU/A), in 2000 to 580 bushels per acre (BU/A) in 2002, a difference of 130 bushels per acre. Production increased the average farmer's revenue by \$1,950/A at the early market price March-May and \$1,4440 per acre during peak production months, August-October.

The demonstration program taught growers the techniques of planting schedules to target early market premium prices. Hence, most farmers with five acres or more, average yield of 588 bushels per acre, realized approximately \$8,232 per acre at \$14 per bushel compared to \$4,900 per bushel before the program.

Among all the sweet potato varieties tested, "Beauregard" and breeding line 94-96 had the best consumer appeal, high yield of 870 bushels per acre compared to other varieties of 580 bushels per acre. The farmers were able to sell these two varieties quicker and at

a higher prices of \$15.50 per bushel. Total net profit of \$4,495 per acre.

Amazing results have been realized from leafy greens in Jefferson and Miller Counties where variety Songoin, Seven Top, Purple Top and Florida Broad Leaf Mustard greens have yield increases of 56% with minimal inputs and higher revenues at both seasons. An environmental stress tolerant variety with early maturing dates allowed growers to sell at a higher price of \$1.80 per pound bunch compared to the usual \$0.50. Hence the average farmer with 1-3 acres realized revenue increase of \$5,200 per acre between September and November.

According to Mr. William Wright, of Jefferson County and Mr. W.D. Dangerfield of Little River County, the use of improved variety recommended by the 1890 Extension Program changed the production of fresh market greens for good. Mr. Wright reported more than 80% increase in total sales in year 2002 compared to previous years before the program was introduced. Mr. Dangerfield noticed geographical territories of his customers were expanded by more 65 miles — customers seeking early spring, fresh vegetables, they can't find at the supermarkets. These are lower in cost and tastier.

Informed knowledge of okra variety choice, “Clemson Spineless and Hybrid Cajun Delight” and advised cultural practices enables farmers to make early quality harvest, hence they were able to sell okra for \$3 per pound for more than three weeks before the arrival of South America cheap okra selling for less than \$0.45 per pound. Average yield of 450 pounds per acre per two weeks earned the farmer additional revenue of \$1,147.50 biweekly. Okra harvest last for three months or more before the killing frost.

- c. Scope of Impact — Eastern Arkansas
- d. CSREES Funding – **\$204,289**
State Matching – **\$133,970**
Other Funding – \$

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Goal 1 — Extension Program 2 — Livestock management program

Key Theme: Animal Production Efficiency

- a. Brief description of activities — The major activities associated with the beef cattle Extension program is increasing the number of producers that are testing their bulls for breeding soundness through the Bull Breeding Soundness Exam Clinics (Bull BSE Clinics) or on their own farms. The specialist has headed up the 4-H Veterinary Science Project for Arkansas since the mid 80's. Forty to sixty youth participate in this activity each year. Four regional 4-H O'Ramas and the State 4-H O'Ramas were held in 2002. The Extension specialist helped coordinate the 4-H Veterinary Science Project. The Veterinary Science Project spans all animal species.

There has been a 83% reduction in swine production in the State of Arkansas over the last twelve to fourteen years. The Extension Specialist works with youth both in 4-H and the Future Farmer of America related to swine production. Commercial production in the State is 98 to 99% contract operations. Swine show continue to be popular, with 778 youth exhibiting 1069 heads of swine at the State Fair.

- b. Impact(s) — The Bull BSE Clinic is a powerful management tool that evaluates a bull's potential for breeding - fertility and physical components. Bull BSE Clinics have been conducted in South Arkansas in cooperation with county Extension agents and large animal veterinarians. An average of 15% of the bulls tested have been classified as unsatisfactory for breeding purposes. The actual cost of replacing a herd sire ranges from \$1,000 to \$2,000 or more. However, the value of identifying and replacing these bulls with range from \$10,000 to \$12,000 per bull if one considers the cost of a missed calf crop, a delayed calf crop or a partial calf crop. This is especially true when one considers the average herd in the state in a one-bull unit operation. There has been a decrease in the number of clinics conducted in the last few years. Interviews with several veterinarians involved with these clinics indicates many producers are having the veterinarian come to their farm to conduct the breeding soundness exam. This represents the adoption of a major management practice on these farms.
- c. Scope of Impact — State of Arkansas
- d. CSREES Funding – **\$163,289**
State Matching – **\$66,985**
Other Funding – \$

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GOAL 2 – A safe and secure food and fiber system.

Executive Summary

One Extension program, Families First – Nutrition Education and Wellness System (FF-NEWS) supports this goal. The project is funded primarily by the USDA Food and Nutrition Service. However, both state and federal 1890 Extension funds augment the program. No 1890 research funds are expended on this goal.

The FF-NEWS Program, in collaboration with a consortium of nine other 1890 institutions, is designed to help food stamp recipients improve the health status of family members and effectively utilize food resources. This culturally sensitive nutrition education program pays specific attention to nutritional problems associated with southern, soul food, and Tex-Mex diets. The 44-week program encompasses four modules, one focuses exclusively on food safety. This module includes instruction on food handling, storing and appropriate food preservation and preparation techniques.

Funded largely from USDA:FNS, the program is in its fifth year of operation. A primary outcome of the food safety instruction has been issuance of certificates by the university's Continuing Education Program. This certification has enabled some participants to find employment in food service establishments while other participants have used the certification for job advancement. Summary evaluations of behavioral changes suggest that the program is highly effective in promoting safe food handling and storage practices among participants.

Summary of Goal 2 Program Area Initiatives and Impacts

Goal 2 – Extension Program 5 – Families First – Nutrition Education and Wellness System (FF-NEWS) – Food Safety

Key Themes: Food Safety

- a. Brief description of activity – The FF-NEWS Program at the University of Arkansas at Pine Bluff offers a comprehensive, culturally sensitive nutrition intervention education program. The program offers a curriculum module on food quality and safety to program participants.

Basic sanitation and safety practices; basic food safety; food purchasing and storage; food thawing; preparation and serving; kitchen safety and food additives are lessons included in this curriculum. Food stamp participants in this program are made aware of sanitation practices that contribute to food quality and safety, and are taught procedures used in purchasing, preparing, and storing food that prevent the spread of bacteria and reduce the risk of food borne illnesses.

FF-NEWS multi-county agents provided 173 in-depth lessons in food safety to 4,556 food stamp recipients. Five thousand twenty (5,020) food safety related educational resources were issued in the program. Food safety exhibits totaled 55, with three hundred twenty (320) program participants making request, for additional food safety related information.

FF-NEWS agents tailored their food safety educational delivery for program participants based on food safety pre-test assessment results. Pre-test results revealed there was a need among participants for information on preventing and detecting contamination in food products.

Newsletters, educational exhibits, hands-on learning experiences, and special interest classes on food quality and safety were formulated and delivered by the FF-NEWS agents.

- b. Impact(s) – Participants in in-depth sessions (4,556) supplied the following data through pre- and post-test assessment, self reporting and other informal evaluation methods:
- 70 percent of participants reported an increase in engaging in safe food storage and preservation practice.
 - 80 percent of participants reported an increase in employing personal hygiene, proper food handling and safe food preparation and storage practices.
 - 70 percent of participants indicated they are becoming cognizant of the condition of

the food and facility(ies) where they purchase food items.

- 65 percent of the participants were more aware of the significance of food product dating.

Listed below are typical testimonials of what food stamp recipients have said about the program:

Lessons on how to store fresh frozen and dry foods were very interesting. I am teaching my children what I learned. - St. Francis County

After a class on food safety, I wash my hands longer and with soapy water. - Woodruff County

I now disinfect my kitchen more. This helps to control bacteria growth. - Jefferson County

Since attending the FF-NEWS food safety classes, I have been using the two-hour rule and not leaving leftovers on the counter top for more than two hours. - Ashley County

I have purchased a meat thermometer to tell when my meats are done. - Drew County

c. Stakeholder Input Process

Coalition meetings were held in the three FF-NEWS cluster areas. The coalitions are composed of community stakeholders including food stamp recipients. Coalitions are instrumental in identifying target populations, aiding in publicizing the program and for program evaluation. Meetings were held at times stakeholders can participate. Seven hundred thirteen (713) agency contacts were made with local agencies to further the goals of the program.

d. Scope of Impact – Eight Counties in Eastern Arkansas

- e. CSREES Funding – **\$2,500**
State Matching – **\$46,010**
Other Funding – USDA-FNS – **\$46,010**

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GOAL 3 – A healthy well-nourished population.

Executive Summary

The health status of individuals and families is influenced by many factors. The availability of nutritious food as well as adequate knowledge of the selection and preparation of food are the foci of one research program and one Extension program that address this problem area.

Researchers began testing selected herbs, vegetables, and nutraceuticals for production requirements under southeast Arkansas environmental conditions and a study of the nutritional value of selected crops has been initiated. If the nutritional value of selected herbs and alternative vegetable crops are determined, the plants can be successfully grown in southeast Arkansas. If the new crops are acceptable to consumers, the nutrient intake in the region can be increased by adding nutrient rich foods to the diet.

A multi-state nutrition education program has made a significant impact on the diet of low-income families by changing the eating habits of a large portion of the population. This Extension program had 4,783 individual contacts during FY 2002. The program is a multi-state partnership involving ten 1890 land-grant institutions designed to help food stamp recipients enhance the health status of family members and effectively utilize food resources. FF-NEWS takes into consideration the obvious link between culture and food selection and preparation practices. Instruction is culturally sensitive and directs particular attention to risk factors associated with health problems common to the population.

Summary of Goal 3 Program Area Initiatives and Impacts

Goal 3 — Research Program 6 — Herbs and vegetable production

Key Themes: Human Health and Nutrition

- a. Brief description of activities — Adapted varieties of Bitter Melon and Bottle Gourd were subjected to second year testing for their productivity and to determine appropriate production practices. New hot pepper lines/varieties were evaluated for taste, flavor, hotness and nutritional qualities. New vegetables, having special nutritional qualities, were evaluated and introduced for further testing. Cooking and taste-testing experiments continued for a second year with efforts to develop recipes that are acceptable to consumers. Some vegetables were also tested in the greenhouse and growth chamber for physiological responses to environmental conditions. Simultaneously, phytochemical analyses continued in an effort to identify bio-active and other types of nutritional compounds.
- b. Impact(s) — Although this research program is only in its second year, a number of superior varieties of Bitter Melon and Bottle Gourd having high yield potential have been identified. When appropriate cultural practices are developed, these varieties will be demonstrated to the growers and extension agents for on-farm evaluation and adoption. Four varieties of Bitter Melon were evaluated for polyphenolics and antioxidant contents. Newly developed hot pepper lines have been attractive to the local communities for their fruits, yield potential, flavor and beauty. A number of southern-pea varieties have been evaluated for micro-nutrients and protein contents. Two selected varieties of southern-pea, ‘Quick Pick’ and ‘Texas Pink-eye’ have gained popularity and the production acreage doubled this year. These findings will help growers and consumers make their choices for financial and health benefits.
- c. Scope of Impact — Arkansas and Southeastern United States
- d. CSREES Funding – **\$143,830**
State Matching – **\$48,161**
Other Funding – \$

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Goal 3 — Research Program 7 — Human nutrition and health

a. This project, funded by the USDA Capacity Building Grants Program, terminated during FY 2002 and the research scientist resigned.

b. Research Scientist

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Resigned

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Goal 3 – Extension Program 5 – Families First – Nutrition Education and Wellness System (FF-NEWS) Diet and Health

Key Themes: Human Nutrition and Human Health

- a. Brief description of activity – Obesity, diabetes, hypertension, and cardiovascular disease rank high among health problems in all racial groups, but general health statistics indicate that the incidence of these health problems is higher in the African-American, Hispanic, and Native-American populations than in other population groups. In addition there is a high incidence in the general population of obesity suggesting benefits to Anglo-American food stamp recipients as well.

The FF-NEWS Program at the University of Arkansas at Pine Bluff is a food stamp nutrition education program. It is designed for food stamp recipients and food stamp eligible households and addresses critical subject matter related to nutrition, health and wellness. Instruction is culturally sensitive and directs particular attention to risk factors associated with health problems.

Four thousand seven hundred eighty three (4,783) food stamp recipients received basic nutrition education information during FY 2002. Three multi-county agents provided 121 in-depth nutrition education lessons accompanied by, 108 education exhibits. During this time period, 3,853 educational resources were issued in the program. These included newsletters, single-concept fact sheets and calendars featuring a nutrition theme.

Program participants were presented with information on food selection, basic nutrition and its role in preventing the major medical disorders occurring in the recipient population. This focus extends the value and usefulness of nutrition education to the food stamp population served.

Seven special interest classes conducted by the agents addressed diet, weight management, and age-related nutritional needs. During these special sessions, agents assisted participants in setting individual goals for improving dietary practices and increased physical activity. Peer support networking for sustained dietary modification and practices is a unique feature in the program delivery. FF-Buddies and FF-Circles are peer strategies utilized to build sense of community, sharing, and networking, all essential in enhancing individual success in achieving diet and health changes.

- b. Impact(s) – Program families (who participated in in-depth sessions 4,783) report the following dietary and/or health modifications from pre- and post- evaluations, self-reporting and other informal evaluation methods:
- 89 percent consider healthy food choices when deciding what to feed their family.
 - 57 percent make sure their children eat something in the morning within two hours of waking up.
 - 53 percent walk at least three times a week.
 - 73 percent select healthy snacks.
 - 57 percent follow the Food Guide Pyramid in planning meals.
 - 45 percent reduce food portion size.
 - 50 percent have a goal of eating fresh fruits and vegetables as part of their daily diet.
 - 35 percent utilize self-monitoring as a way to improve health goals.

Listed below are typical testimonials of what food stamp recipients have said about the program:

FF-NEWS information has inspired me to prepare nutritious meals.

-program participant, St. Francis County

This program has been good for my family; we are eating healthier and feeling better.

I've enjoyed being a part of it.

-program participant, Lincoln County

The information gained has been helpful in preparing meals.

-program participant Lincoln County

I now eat better meals and do physical activity to help maintain body weight.

- program participant Woodruff County

- c. Stakeholder Input Process – Coalition meetings were held in the three FF-NEWS cluster areas. The coalitions are composed of community stakeholders including food stamp recipients. Coalitions are instrumental in identifying target populations, aiding in publicizing the program and for program evaluation. Meetings were held at times stakeholders can participate. Seven hundred thirteen (713) agency contacts were made with local agencies to further the goals of the program.
- d. Scope of Impact – Eight Counties in Eastern Arkansas

- e. CSREES Funding – **\$7,500**
State Matching – **\$138,028**
Other Funds – USDA:FNS – **\$138,028**

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Goal 4 — An agricultural system which protects natural resources and the environment.

Executive Summary

The agricultural research program supports two research projects that address natural resources and the environment. The integrated pest management project (Research Program 8) was designed to obtain needed data to determine the efficacy of employing recent advances in biotechnology and biological pest control to reduce disease and predator damage to the vegetable crop combinations found in small farm and limited-resource farm systems. Information relating to the proposed IPM systems on no-target species must be determined prior to full scale use by vegetable growers. The use of bio-transformed plants and genetically modified organisms for pest control would reduce environmental impact of the multi-cropping systems of the small-scale vegetable grower.

Research Program 9 (Small Ruminant Nutrition/Management) supports research on affordable and productive alternatives to costly large animal farming systems. Goats, being small ruminants, offer small and limited-resource farmers an affordable animal production alternative to cattle and swine. Due to size and other characteristics goats have less impact on the environment. Pasture-based system for goats have less point runoff compared to a high-density production system that a farmer with limited land area would have for cattle. Goats can also utilize low-quality crop by-products to produce high-quality protein. The research proposed in the five-year plan of work will establish guidelines for a pasture goat production system based on mixed pasture and the use of common crop by-products. The level dietary supplementation and grazing efficiency must be determined to increase the understanding of how crop by-product utilization is related to production costs and environmental protection.

Summary of Goal 4 Program Area Initiatives and Impacts

Goal 4 — Research Program 8 — Integrated pest management

Key Themes: Biological Control, Integrated Pest Management

- a. Brief description of activities — Targeted insects were monitored in established plots of cowpea, sweet corn, and pigeon-pea. The cowpea plots contained standard cultivars used by farmers in Southeast Arkansas. GMO sweet corn were established in plots with normal commercial cultivars. A cowpea aphid population irruption was observed only once during the three-year observation period. The irruption was uniform, however, this was considered minor and sporadic in occurrence. Corn earworm damage did not differ significantly among the seven cowpea cultivars grown.

GMO sweet corn did not affect the distribution of lady beetles among transformed and normal cultivars. GMO for a melon viral pathogen of squash did not affect the distribution or abundance of squash bugs on sweet corn. But field corn dramatically reduced the European Corn bore population in one location but not significant difference in aflatoxin concentrations were detected.

All pigeon-pea plots were denuded by velvet-bean caterpillar populations on one occasion, in early Fall. Helicoverpa zea was a pest and built large populations in early Fall. This characteristic might make pigeon-pea a good trap crop.

- b. Impact(s) — Data collected is essential in developing IPM procedures for small and limited resource farmers. The diversity of crops utilized and the impact of bio-transformed crops and GMOs will require continued long-term study to assess economic impact. The projected impact of the work is a greater profit margin to farmers resulting from reduced pesticide use and reduced environmental damage.
- c. Scope of Impact — Southeastern United States
- d. CSREES Funding – **\$98,767**
State Matching – **\$33,072**
Other Funding – \$

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Goal 4 — Research Program 9 — Small ruminant nutrition/management

Key Theme: Sustainable Agriculture

- a. Brief description of activities — A second year forage yield and composition evaluation of a typical pasture browsed by goats was conducted. A two-acre pasture was divided into six 100 ft x 145 ft plots and previously planted mixed forage was allowed to re-generate and grown to maturity. Samples of mixed forage were collected at two stages (A and B) of maturity using a square of 1.5 ft x 1.5 ft. The first sets of samples were collected during the late flowering stage (A) of maturity (May 23, 2002) while the second sets of samples were collected during the matured seed stage (B) (June 27, 2002). Pasture forage yield and nutritional composition were compared. Pasture forage yield (on DM basis) for A and B were 6,508.7 kg per hectare compared to 13, 030.7 kg per hectare, respectively. The difference was significant ($P<.05$). Nutritional analyses showed that the B forage contained significantly ($P<.05$) higher levels of DM and lower levels of crude protein ($4.41\pm 0.33\%$ vs. $6.41\pm 0.48\%$) than A forage. There were no difference ($P<.05$) in neutral detergent fiber (NDF), acid detergent fiber (ADF), acid detergent lignin (ADL), Ash and Estimated Digestible DM for both forages. These data suggests that production performance may be optimized for animals grazing on mixed grass at the late flowering stage of maturity than those that are grazing on the mature seed stage mixed grass. However, higher yield of DM is obtained when the forage is harvested during the mature seed stage.
- b. Impact(s) — The stage of maturity of forages before they are harvested and used as feed for animals appear to affect their dry matter yield, nutritional composition and digestibility. Information collected from this exercise would enable farmers to know the right time to harvest forages for maximum bulkiness and nutritional benefits to the animals. This will increase animal productivity and the farmers' income. The economic impact will be determined in the next phase of this research when comparisons can be made in feeding studies.
- c. Scope of Impact — Southeast Arkansas
- d. CSREES Funding – **\$103,580**
State Matching – **\$34,684**
Other Funding – \$

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GOAL 5 – Enhanced economic opportunity and quality of life for Americans.

Executive Summary

Two research programs and one Extension program support the enhanced economic opportunity and quality of life goal. The decline of minority farmers and the limited opportunities present for under-educated minority youth in Arkansas highlight the need for these programs.

The constant struggle of limited-resource and minority farmers to remain in the farming business suggests a need to determine root causes of their problems and to clarify production, policy and operational changes needed to allow this population to remain viable. Thus far, the research has identified several critical areas that require improvements – access to credit, access to markets and self-perceptions of their production practices and management skills.

Public schools throughout the nation struggle with both achievement and discipline problems of students. As these problems have escalated, the involvement of parents in the educational process has declined. Research program 11 seeks to study the link between problems in schools and the level of parental involvement and to identify strategies that promote greater parental involvement in the education of youth.

The vast majority of children in single-parent families are in female-headed households where they are more likely to be poor. This is especially true of minority children. Research predicts that children being raised without the support and presence of a father in the home are at greater risk of living in extreme poverty, using drugs, becoming a teen parent, being involved in violent crime, and being incarcerated before they reach the age of 18. Children from low-income, minority families are at risk of repeating grades early in their school years. Many will later become school dropouts. The 1890 Extension family and youth programs address these myriad issues. The Young Scholars Program is designed to reverse the poor academic trends of low-income, minority children and to help them to see college as an achievable option. The parenting program empowers parents and child-care providers to enhance the growth and development of children and adolescents, and the 1890 adolescent pregnancy prevention program emphasizes decision making and is designed to stem the incidence of pregnancy among adolescents.

Summary of Goal 5 Program Area Initiatives and Impacts

Goal 5 — Research Program 10 — Economic behavior of minority farmers

Key Theme: Agricultural Financial Management

- a. Brief description of activities — A study was completed to document historical trends among minority farmers covering the early 1900's to the present. The survey of minority farm households was designed to determine their economic behavior, decision-making skills, and to establish a household data set. Two hundred and forty-one (241) farm households were surveyed. A total of 83 farmers participated in four focus group discussions. Based on results obtained from the survey and focus group discussions, farmers were encouraged to study market demands when making production decisions. A collaborative effort between this project and marketing personnel with the USDA:AMS developed two marketing workshops that reached 175 minority farmers. Efforts were also made to help farmers with direct marketing to three minority-owned food businesses and three state purchasing offices.
- b. Impact(s) — The project has had a positive impact on farmers' perceptions of themselves and their abilities to compete in a highly competitive environment. Farmer perceptions of governmental institutions and the University of Arkansas at Pine Bluff are also improving as demonstrated by changes in activities. Farmers have begun seeking markets directly (cutting out the middle man), as evidenced by the group in Arkansas that is in the process of accessing local school districts to sell produce. Farmers have begun to view the project as an ally and a source of information. They call the project office often. This has resulted in farmer requests that project personnel act as liaisons between governmental institutions and the farmers. The project has put the farmers in touch with FSA, NRCS, State Pollution Control and Ecology and others.

Members of the Arkansas State Legislature have requested a copy of the findings from the study. They would like to use the information as a bases for drafting state legislation that may impact the farming community.

- c. Scope of Impact — Lower Mississippi Delta States
- d. CSREES Funding – **\$93,221**
State Matching – **\$31,214**
Other Funding – \$

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Goal 5 – Research Program 11 – Improving quality of life

Key Theme: Other – Parental Involvement in Schools

- a. Brief description of activities – Public schools throughout the nation struggle with both achievement and discipline problems of students. As these problems have escalated, the involvement of parents in the educational process has declined. Research Program 11 seeks to study the link between problems in schools and the level of parental involvement and to identify strategies that promote greater parental involvement in the education of youth. One focus group interview and eight (8) follow-up interviews were conducted with parents to ascertain their views about parental involvement. Additionally 600 surveys were distributed to parents in a local school district, 291 surveys were returned. A Parental Involvement Task Force meeting consisting of parents and parent educators in two school districts was convened to assist the project leader in implementing the research focus. Survey data and results of the focus group session, the individual interviews and the task force recommendations are being analyzed.
- b. Impact(s) – Comments from parents revealed that they have an interest in publically expressing their concerns about parental involvement. A Parental Involvement Task Force meeting was convened to discuss problems that limit parental involvement in schools. A main issue that surfaced from the surveys and meetings is that working parents do not have time off from work to attend school meetings, parent conferences, and other opportunities for school involvement. The task force is collaborating with a state legislator to assist in developing language for a legislative bill that will require employers in Arkansas to give parents four to six hours of paid leave per year to attend school meetings.
- c. CSREES Funding – **\$86,545**
State Matching – **\$28,978**
Other Funding – \$

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Goal 5 – Extension Program 7 – Family and youth programs

Key Theme: Children, Youth and Families at Risk

a. Brief description of activity – Young Scholars Program

In 1996, a Young Scholars Program was implemented in Monroe County to reverse the negative academic trends of low-income, minority children and help them succeed in school. The program, now expanded to Lee County, promotes male responsibility and targets low-income, minority children, ages 6-15 and their families. Once the children reach age 16 they remain in the program until they finish high school and serve as role models for the other children.

The program is implemented in housing projects for low-income families. Ninety-six children and their families are enrolled in the program. Referred to as *Young Scholars*, the children meet one hour per day, five days a week in a year-long after-school program. They are taught math and science concepts through these subject-matter areas: horticulture, plant science, agricultural products, soil science, wetlands/natural resources, environmental stewardship, nutrition, consumer education, clothing and textiles and housing and environment. The children engage in learning experiences that strengthen character, build social skills, enhance the development of high self-esteem and successful resolution of conflict. They spend a week in summer day camp to refine the skills learned in the after-school program. Day camp is taught by scientists from the university who set up mobile labs in the counties. Parents are organized into small groups that meet once a week for one hour and they must serve two hours per month as volunteers in the after-school program. The parental component includes the curriculum for the children as well as information on parenting, job-related skills, career and personal development, stress management and coping skills, family relationships, and economic and self-sufficiency skills.

All of the children participate in National Teach Children to Save Day that teaches money management skills and encourages them to save money for the future. The children participated in a Mini-Society Program designed to teach entrepreneurship, economics and citizenship concepts. Through Mini-Society they developed and experienced their own “real-world” in the context of entrepreneurship; acquired concepts and skills in multiple subject matter areas (writing, math, data analysis and communication); discovered the importance of cooperation; enhanced their sense of empowerment and self-sufficiency; and had fun while learning. The Mini-Society program offered strategies and activities that correlate with the goals and objectives of the Arkansas Department of Education’s Curriculum Frameworks and Benchmarks. Before the program there was little community participation by the children and families. Today the children participate in a number of school and community organizations and activities. They participated in a year-long leadership program that stressed strong character traits such as honesty, respect, responsibility, fairness, caring and citizenship. Each of the children completing the

program received a new bicycle and helmet. Many of the parents are now leaders in the school PTA and faith-based organizations.

- b. Impact(s) – Program faculty report major transformation in the children and families. Major impacts are noted in the areas of social and self-sufficiency skills and use of resources.
- Parents have increased employment from 20 percent at the start of the program 1996 to 89 percent today.
 - Two families have moved out of subsidized housing to become homeowners.
 - Prior to enrolling in the program less than 20 percent of the children were on the honor roll. Eighty-five percent of the children have been on the honor roll.
 - The first graduate of the program was admitted to the University of Arkansas at Pine Bluff in August 20, 2002.
 - The children have achieved a high degree of maturity. They are well behaved and respectful of peers and adults. They are developing strong character traits including being dependable and trustworthy. The Mayor of Brinkley, who is a member of the Young Scholars Task Force, had this to say. *“I am happy to be a part of this program. I have never seen children so well behaved and who are able to perform at the level they do. They constantly amaze me.”*
 - Three program parents have enrolled in a community college to further their education. One parent is enrolled in the University of Arkansas at Pine Bluff.
 - Nine parents attend night classes in pursuit of the GED.
 - Twelve families enrolled in an assets building program sponsored by the Good Faith Fund of Pine Bluff. They invest up to \$1,000 in savings for buying a home; making repairs or improvements on an existing home; post secondary education; starting a business or improving an existing small business. For each \$1 saved they are given a return of \$3. One program family describes the impact the program has had on her and the family this way: *“Before we became involved in this program we didn’t know what we could do. It was like we were in bondage and just needed that little push to get us out of our shells. Now we are involved in everything that is positive and that helps us to grow. I wish this program had been available to me years ago. There is no telling where I would be now.”* Another one said: *“This program is helping me to save money, to feed my family better and to keep my children warm and safe.”*

a. Brief description of activity – **1890 Adolescent Pregnancy Prevention Program**

The 1890 Extension family and child development specialist implemented the 1890 adolescent pregnancy prevention program 24 years ago. She continues to serve as the primary instructor for the program. The program is abstinence-based and reaches public school students in grades 7-12. Special emphasis is placed on communicating with parents; building a positive self-concept; goal setting; understanding moral values; consequences of teenage pregnancy; and decision-making. The program has been evaluated by students, parents, teachers and school administrators who find the program to be significant in helping students make better decisions. TEENS on the GO, a bi-monthly newsletter series, was developed to complement the teachings in the program and to strengthen the decision-making skills of youth.

b. Impact(s) - In FY 2002 the Teens on the Go newsletter series (6 issues) exceeded 100,000 contacts with Arkansas teens. Each series includes an issue on drug-abuse prevention and teen sexuality. Student evaluations indicate that they gained decision-making skills through the newsletters.

a. Brief description of activity – **Parenting Education Program**

1890 Extension family and child development faculty work in partnership with county and state agencies, and faith-based organizations to improve parenting skills of parents and the quality of child care programs for pre-school children. Since FY 2000, total contacts for training provided childcare professionals have exceeded 1100. A diverse population of childcare professionals has been trained representing family day care homes, child care centers, Head Start and church related programs. These childcare professionals trained by 1890 Extension faculty have implemented parenting programs in their centers. The curriculum is provided by 1890 Extension. Contacts with parents in these programs exceeded 500 in FY 2002. Training effort contribute to increased child development skills that enhance the growth and development of pre-school children. These skills have included: using developmentally effective approaches to learning; linking programs to children's home language and culture; helping children build connections; encouraging cooperation and communication; helping children work through differences, teaching kindness and compassion in a diverse world.

a. Impact(s) – Pre- and post-data assessment and other evaluation methods indicate the success of the program

- The 1890 Extension faculty contributed to over 150 child care professionals successfully completing CDA training and receiving child development associate credentials.
- Thirty-five percent of those trained increased their skills for planning a safe, healthy learning environment for the children.

- Sixty-two percent gained skills for improving the quality of their child care programs.
- Sixty-five percent developed positive ways to support children’s social and emotional development.
- Eighty percent developed strategies to establish productive relationships with families.
- Seventy-five percent initiated strategies for managing an effective program operation.
- Thirty-four percent maintained their commitment to the profession by continued involvement in high quality training experiences and participating in educational opportunities that help them to meet the diverse needs of their clientele.

c. Stakeholders Input Process

A task force is formed in each county where the Young Scholars program operates to get stakeholder input. The role of the task force includes: identifying concerns at the community level; reviewing curriculum in reference to needs of the community; identifying target areas; referring participants to the program; identifying resources for carrying out the program; publicizing and promoting the program; identifying funding sources and implementing and evaluating the program.

The stakeholders on the task forces represent a broad cross section of the people. They include enrolled children and parents, representatives from business and industry, state and local governmental agencies, local schools, faith-based organizations and the medical community. One child serves as chair and another as secretary of the task force. A number of ways were used to identify stakeholders to ensure that diversity is achieved. Contact was made with a number of community persons who represent various racial and ethnic groups. A file of news articles showcasing potential participants is maintained. Task force meetings are held at times when stakeholders can attend and in locations where they feel comfortable. Minutes are written of each meeting that denotes input given and actions considered. Stakeholder’s input is also received through follow-up surveys, and evaluations and merit reviews.

d. Scope of Impact – The Young Scholars Program is implemented in two counties. Other programs have state-wide impact.

e. CSREES Federal Funds – **\$344,647**
 State Matching – **\$115,715**
 Other (private gifts) – **\$47,484**

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ANNUAL REPORT OF ACCOMPLISHMENTS AND RESULTS

Part II – Aquaculture/Fisheries Research and Extension Programs

Goal 1: An agricultural system that is highly competitive in the global economy.

Executive Summary

Aquaculture/Fisheries Center research and Extension activities were developed in the two areas of catfish and baitfish production and management under Goal 1. Specific output from the 2002 programs included the following: 10 refereed journal articles on catfish and 2 on baitfish; 11 abstracts published on catfish and 13 on baitfish. There were 4 publications on catfish for the Extension Fact Sheet. Ten manuscripts were published for catfish and 10 for baitfish. There were 5 presentations at national professional on catfish and 8 on baitfish. Two regional professional meeting presentations were done on catfish and 3 on baitfish. One state professional meeting presentation was done on catfish and one on baitfish. There were 3 additional symposium presentations on catfish and 4 on baitfish. Other presentations included 4 on catfish and 6 on baitfish.

STAKEHOLDER INPUT PROCESS

Stakeholder input is a continuous process in the Aquaculture/Fisheries Center. In the early part of 2002, researchers and extension specialists devoted time to meeting with the respective trade and professional associations related to aquaculture and fisheries. These include the annual meetings of the Catfish Farmers of Arkansas, the Arkansas Bait and Ornamental Fish Growers Association, the Aquaculture Division of the Arkansas Farm Bureau, the Arkansas Chapter of the American Fisheries Society, and the Arkansas Catfish Promotion Board. During these meetings, individuals have the opportunity to discuss research and extension programming needs with industry representatives. Several members of the Aquaculture/Fisheries Center are requested to meet with the respective boards of the major trade and professional associations in the state. The boards use this as an opportunity to discuss specific research and extension needs of their industry. Scientists and extension personnel then bring these needs back to staff meetings of the Aquaculture/Fisheries Center for discussion and prioritization.

Throughout the year, Extension specialists relay additional research and Extension programming needs to other faculty and staff through the monthly meetings of the Aquaculture/Fisheries Center. Since Extension faculty are integrated with research and academic programs within the Aquaculture/Fisheries Center, input into Extension activities and programming is also obtained from research and teaching faculty. The active fish health laboratories provide ample opportunities to discuss farm-level problems with growers and to identify research and Extension programming needs.

The National Fisheries Advisory Council is composed of local, state, and national representatives, to provide advice and guidance to the program. The council members are selected to be certain to have adequate representation from all sectors of the aquaculture industry and to have representation of natural fisheries issues, problems and priorities.

The new five-year plan for the Aquaculture/Fisheries Center identified specific stakeholders related to natural fisheries programmatic areas. In 2002, representatives of the agencies and groups that were identified as stakeholders were invited to participate in a focus group session. Out of this session grew a new program priority area called Recreational Fishing. Specific objectives for this will include research on population dynamics, stocking programs and hatchery production methods of major sportfish species such as largemouth and hybrid striped bass. Implementation of this program in FY 2003 is expected to enhance tourism in the state and yield economic benefits to the state and communities.

PROGRAM REVIEW PROCESS

All Evans-Allen research projects and manuscripts that are to be submitted to refereed journals for publication undergo an internal review. The reviewers sign a form to indicate when the manuscript is deemed ready to be submitted. In addition, the Aquaculture/Fisheries Center conducted an external review in 1999 to comply with the Merit Review Process mandated in the five-year POW.

In November, 1999, Drs. Robert P. Romaine, Louisiana State University, Bill Simco, University of Memphis, Jimmy Avery, Mississippi State University and Robert Durborow, Kentucky State University were invited to review the research and extension activities as a component of the Merit and Peer Review process of the Plan of Work of the Cooperative State Research, Education, and Extension Service (CSREES). Drs. Romaine and Simco were responsible for reviewing the research and teaching programs of the Department of Aquaculture and Fisheries and Aquaculture/Fisheries Center at the University of Arkansas at Pine Bluff. Drs. Avery and Durborow reviewed Extension programs and activities in the Aquaculture/Fisheries Center. Their report is appended to this annual report.

Several programmatic changes were made in response to the external evaluation. The Extension appointment of David Heikes was changed to provide for a greater time allotment for work on the fish grading equipment. Also, more research information is being included in the Extension newsletter that is published. The web site for the Aquaculture/Fisheries Center is under expansion and will include more research summaries and information.

SUMMARY OF GOAL 1 – Program Initiatives and Impacts

Research and Extension Projects

Research Program 4 – Extension Program 3 – Catfish production and management

Overview

Research

Catfish research in 2002 focused on five main problem areas identified by stakeholder groups: fish health, aquaculture engineering, production economics of catfish production and of treatment alternatives for pond effluents, water quality management, and fish nutrition. Specific studies conducted in 2002 included:

- a. Fish disease research and diagnostics
- b. Grading catfish for the fingerling and processing markets
- c. Regulation of aquaculture effluents
- d. Economics of stocker catfish production
- e. Analysis of catfish pricing and market dynamics: the role of imported catfish
- f. Row crop herbicide drift impacts on fish pond water quality

Extension

Catfish Extension programs conducted in 2002 included programs in the areas of fish health, catfish yield verification, technical assistance for new catfish producers, demonstration of new in-pond grading technology for fingerling producers, financial management of catfish farms, and with EPA information collection requests.

The rapid growth of the catfish industry in southeast Arkansas leveled off in 2002. Expansion slowed due to declines in the farm price of catfish in response to dramatic increases in imports of a Vietnamese fish that began to be imported under the name of “catfish” in 2000. The economic downturn in 2001 further depressed farm prices of catfish. Extension assistance provided by the UAPB Aquaculture/Fisheries Center switched its emphasis from providing financial planning assistance to prospective catfish farmers to intensive financial analysis of existing farm operations to improve financial analysis was developed and made available to farmers through a workshop and through the diagnostics laboratories. Overall, the UAPB Aquaculture/Fisheries Extension program assisted over 53 individuals with farm financial planning in 2002 and provided 8,838 individual contacts with new and existing growers.

Project 1 – Fish disease research and diagnostics

Impact Area – Research/Extension

Key Theme: Other – Competitive agricultural systems

- a. Brief description of activity – Losses to diseases have a major economic impact on the profitability of warmwater aquaculture. The UAPB Extension Program operates four (4) fish disease diagnostic laboratories located in the primary fish production regions of the state. Together, the laboratories handle more than 2500 cases per year. In addition, research projects at the laboratories discover new and emerging fish diseases, investigate the efficacy of treatments, and develop new diagnostic methods.

- b. Impact(s) – Typical aquaculture ponds may contain from \$15,000-\$50,000 worth of fish and mortality from untreated disease outbreaks typically kill from 10-75% of the fish in the pond. Based on the means of these ranges, the number of cases handled, and a reasonable cure rate, the diagnostic laboratories save farmers more than \$10,000,000/yr. Research projects including the development of new assays (PCR) for viruses, the discovery of several new pathogens, and a better understanding of the role of algal toxins in aquaculture have increased the success of the diagnostic program.

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Project 2 – Grading catfish for the fingerling and processing markets

Impact Area – Research/Extension

Key Theme: Other – Competitive agriculture systems in a global economy

1. Brief description of activity – The inability of the catfish producers and processors to accurately sort fingerlings and food fish by size is estimated to have cost the industry as much as \$30,000,000/yr.

A new in-pond fish grader was developed. The grader has the capacity, accuracy, and durability to allow precision grading while reducing labor costs.

2. Impact(s) – The new in-pond fish graders are now widely used to efficiently grade catfish. The fingerling grader technology has been adopted by 7 farms including all major producers. These farms now promote “precision graded” fingerlings and advertisements in trade journals include statements like “We use state of the art in-pond fish grading equipment.” Five food fish producers have adopted the new technology to select fish to meet specialty markets demanding larger or smaller than normal fish. The grader has also been adopted by a producer of hybrid striped bass. In recognition of the importance of this work, the PI was given an award on 1/31/03 by the Catfish Farmers of Arkansas.

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Project 3 – Regulation of aquaculture effluents

Impact Area – Research/Extension

Key Themes: Other – Competitive agriculture systems in a global economy Harmony between agriculture and environment

- a. Brief description of activity – In response to concerns raised by environmental groups, the EPA has considered regulating effluents from pond aquaculture. Little was known about the character of water discharged from warmwater ponds. Proposed treatment methodologies would have added very significantly to the cost of aquaculture products.

UAPB has conducted 2 large studies to characterize effluents and 3 separate economic analyses to investigate the costs and benefits of potential effluent regulations. Those studies showed that warmwater pond aquaculture has very little adverse effect on environmental quality. The studies were used by the EPA in their justification of proposed regulations that largely exempt pond finfish culture from additional regulation.

- b. Impact(s) – Early rules considered by the EPA would have cost Arkansas farmers millions of dollars per year. The work done at UAPB allowed regulators to suggest alternatives that will not have a negative impact on warmwater pond aquaculture. In recognition of the importance of this work, one of the investigators was given an award on 1/31/03 by the Catfish Farmers of Arkansas.

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Project 4 – Economics of stocker catfish production

Impact Area – Research/Extension

Key Theme: Other – Competitive agriculture systems in a global economy

- a. Brief description of activity – Determining the best management strategy to improve catfish farm profitability is quite complex. Stocker-size fish stocked in multiple-batch production ponds are thought to survive better, grow faster and reach market size sooner. However, little is known about the cost of producing stocker catfish.

Two pond production studies were conducted to analyze 1) the effect of stocking density on production of catfish stockers; and 2) the effect of stocking size of fingerlings on production of catfish stockers. Enterprise budget and risk analyses were conducted.

- b. Impact(s) – Economic analyses indicated that the medium stocking density of 40,000/ac was the least-cost treatment to produce stocker catfish from 2.6-in fingerlings and that costs of producing stockers were lower if 4-in, as opposed to 6-in fingerlings were used. These studies provide a basis for evaluating the production characteristics and costs of producing stocker catfish. Catfish farmers can use this information to evaluate the feasibility of moving to a three-phased production system. While additional work is needed to identify optimal production systems for stocker and growout production, these data provide a basis for farmers to make decisions with regard to stocker production on their individual farms.

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Project 5 – Analysis of catfish pricing and market dynamics: The role of imported catfish

Impact Area – Research/Extension

Key Theme: Other – Competitive agriculture systems in a global economy

- a. Brief description of activity – Farm prices of catfish have declined since 2001. A variety of reasons have been offered for this decline, including the impact of lower-priced imported fish from Vietnam, the declining economy, and September 11. However, there has been little formal analysis of price determination mechanisms in the catfish market and the relationships between producer price, domestic processed price and import prices.

Time series statistical analyses were conducted using cointegration techniques to examine the price determination mechanisms in the catfish market and to determine the relationships between producer price, domestic processed price and import prices.

- b. Impact(s) – A long-run equilibrium relationship exists between pairs of producer price, domestic processed price and import price. A positive relationship exists between the producer price of catfish and the price of domestic frozen fillets implying that an increase in the price of one is associated with or accompanied by an increase in the other. A positive relationship also exists between the price of domestic frozen fillets and imported fillets. However, a negative relationship exists between producer price and import price. Results from Granger causality tests and error-correction model estimations suggest that the market for domestic frozen fillets plays a significant role in the price determination of imported catfish both in the short run and in the long run. Results provide some information about price relationships and the role that individual prices play in the determination of other prices. This is useful for assessing price trends and predicting price changes in the catfish market.

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Project 6 – Row crop herbicide drift impacts on fish pond water quality

Impact Area – Research/Extension

Key Theme: Other – Competitive agriculture systems in a global economy

- a. Brief description of activity – Fish farmers complain each year that drift from aerial applications of herbicides destroys plankton blooms in fish ponds and cause oxygen problems.

A total of 11 rice herbicides (7 mid-season and 4 spring herbicides) were evaluated for impacts on fish pond plankton and water quality. Each herbicide was tested at three rates: a full or overspray rate, a high drift rate of 10% of the full rate, a low drift rate of 1% of the full rate and a control without herbicide.

- b. Impact(s) – Only propanil (Stam) was found to be of concern, and, at full rates, resulted in stressful levels (below 3 ppm) of dissolved oxygen for 48 h. However, there is a possibility that toxic effects from pendamethalin (Prowl) to cultured fish exist as the full rate is 0.1 ppm from the level toxic to channel catfish. Although propanil was identified as an herbicide of concern to water quality, it only caused reduced water quality at overspray or direct spray rates. Proper spray procedures to rice fields adjacent to fish ponds with these herbicides were not indicated to be of concern to fish production.

Cooperating Institutions: H. K. Dupree Stuttgart National Warmwater Aquaculture Center

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Research Program 5 – Extension Program 4 – Baitfish production and management

Overview

Research

Baitfish research in 2002 focused on five main research areas: effluents, hatchery methods, pond management, fish health, and baitfish nutrition. Specific projects conducted in 2002 included the following:

- a. Discovery and control of SVCV and exotic fish virus
- b. Minimizing effluents from baitfish farms
- c. Developing hatchery management techniques from baitfish
- d. Vitamin C & E interactive effects in golden shiners
- e. Fish disease research and diagnostics

Extension

Baitfish Extension programs conducted in 2002 included programs in the areas of fish health, water quality diagnostics, intensive in-door hatchery spawning and fry rearing, and assistance with the EPA rule-making process.

The baitfish industry has been a stable industry for many years. Over time, however, costs have continued to increase slowly and have slowly eroded farm profits. New hatchery technologies that have been developed at UAPB over the last decade have been transferred to the baitfish industry. These new technologies have allowed baitfish farmers to expand production levels on far fewer acres. This intensification has resulted in significant increases in farm productivity measures, decreased dependence on ground water resources, and reduced costs of production. The UAPB Extension program provided over 5,071 individual contacts with baitfish farmers and organized 3 educational meetings with baitfish farm organizations.

Project 1 – Discovery and control of SVCV and exotic fish virus

Impact Area – Extension

Key Themes: Other – Competitive agriculture systems in a global economy Harmony between agriculture and environment

- a. Brief description of activity – Spring viremia of Carp (SVC) is a viral disease capable of killing many species of fish including carp, minnow, and ornamental species that contribute more than \$90 million to American aquaculture production. The disease is one of only 5 listed as “reportable” by the OIE and has never been detected in North America. In the summer of 2002 the UAPB Fish Disease Diagnostic lab detected SVC in a sample of ornamental fish from a farm in North Carolina and identified the virus in culture of wild fish from Wisconsin.

The discovery was reported to the USDA and international authorities. In cooperation with USDA-APHIS and USFWS, a major effort was made to determine the current distribution of the virus and to prevent its further spread.

- b. Impact(s) – Following our discovery of the virus, state official quarantined the SVCV-infected sources within hours. Our diagnostic and research results are fundamental to a multimillion-dollar indemnification and eradication program currently under consideration by APHIS. Following the timely quarantine of the infected regions of NC and WI, the virus has not been discovered elsewhere in commercial aquaculture.

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Project 2 – Minimizing effluents from baitfish farms

Impact Area – Research/Extension

Key Theme: Other – Competitive agricultural systems

- a. Brief description of activity – The USEPA is developing effluent limitation guidelines for aquaculture, but there is no information available on effluents from baitfish culture. Arkansas is the nation's leader in the production of baitfish, with approximately 27,000 acres of earthen ponds. Baitfish farms are primarily family operations or partnerships, and nationally, 93% of baitfish farmers are small businesses, with sales of less than \$750,000.

The University of Arkansas at Pine Bluff participated in a regional project to characterize effluents from aquaculture and to develop recommended management practices to reduce effluent quantities and improve the quality. Researchers conducted on-farm studies to determine solids, biochemical oxygen demand and nutrient concentrations in effluents during pond discharge. In addition, research trials evaluated various methods to conserve water during pond preparation for fry stocking.

- b. Impacts(s) – Based on effluent characteristics and with knowledge of farm operations, Extension Specialists worked with the baitfish farmer's association to develop a "Best Management Practices" guide to minimize the environment impact of baitfish farming.

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Project 3 – Developing hatchery management techniques from baitfish

Impact Area – Research/Extension

Key Theme: Other – Competitive agriculture systems in a global economy

- a. Brief description of activity – Arkansas fish farmers sell \$9.9 million of fathead minnows annually, with rosy red minnows accounting for 45% of total sales. A color variant of the normal fathead minnow, “rosy red” fatheads are highly valued but commercial production is problematic due to poor survival.

The number of eggs produced by each of four different densities of rosy red fathead minnows stocked in fertilized 5.9 M² plastic-lined outdoor pools was compared for a 15-d period during the spawning season.

- b. Impact(s) – Total egg production over the sampling period generally increased with broodstock density. Average egg production was 1,173; 3,115; 2,737; and 4,352 eggs/lb broodstock/day for the 30, 90, 150, and 210 fish per pool treatments, respectively. This implies that for a commercial pond stocked with broodfish at a rate of 500 lb/ac, up to 2.2 million eggs/ac could be harvested daily. As an alternative to the traditional spawning/rearing pond method, egg collection and jar hatching of fathead minnow eggs has the potential to help producers meet the market demand for this variety.

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Project 4 – Vitamin C and E interactive effects in golden shiners

Impact Area – Research/Extension

Key Theme: Other – Competitive agriculture systems in a global economy

- a. Brief description of activity – As baitfish production continues to intensify, the requirements for vitamins as well as their interactions will be important to formulate nutritionally complete feeds.

A feeding trial was conducted in a flow-through system. Triplicate groups of 30 uniform fish initially averaging 0.79 g were fed eight purified diets supplemented with 23, 43, 98, or 222 mg of AA and either 0 or 38 mg of DL- α TA-tocopherol acetate using a 4x2 factorial design.

- b. Impact(s) – A strong interaction between dietary vitamins C and E was evident in the ACH50. In this study, a level of α TA (31 mg/kg dry diet) was sufficient to prevent vitamin-E-deficiency signs and support normal growth.

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Project 5 – Fish disease research diagnostics

Impact Area – Research/Extension

Key Themes: Other – Competitive agriculture systems in a global economy Harmony between agriculture and environment

- a. Brief description of activity – The aquaculture industry is under great economic pressure as a result of imports and declining producer prices. One of the largest impacts on the cost of production is losses due to disease.

UAPB maintain 4 fully equipped fish disease diagnostic laboratories. These have diagnosed more than 2300 cases in the last year and conducted numerous fish healthy inspections.

- b. Impact(s) – The value of the fish in a typical aquaculture pond is 20-50 thousand dollars. If work by the diagnostic program saved only 10 % of the fish in 2000 ponds (a very conservative estimate), savings to Arkansas farmers amount to more than \$7,000,000/yr. In addition, more than \$1,000,000 in fish every year are exported to other states and countries based on health inspections available only at UAPB.

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Summary of financial resources expended in Aquaculture Programs related to Goal 1

Research Programs 4 and 5	Catfish	Baitfish
Source of Funds		
CSREES	340,205	324,110
State Matching	122,674	177,937
Other (private gifts)	180,746	221,491
Total Research Programs 4 and 5	643,625	723,538
Extension Programs 3 and 4		
Source of Funds		
CSREES	238,993	213,623
State Matching	115,835	81,151
Other (private gifts)	148,037	176,637
Total Extension Programs 3 and 4	502,865	471,411
Total Research and Extension Programs	1,146,490	1,194,949

GOAL 4 – An agriculture system which protects natural resources and the environment

Extension Program 6 – Farm pond management and irrigation reservoirs

Executive Summary

Aquaculture/Fisheries Center Extension activities were developed in the area of Farm Pond Management and Irrigation Reservoirs under Goal 4 in 2002. Specific output included 1 abstract, 1 symposium presentation and 4 other presentations.

Impact Area - Extension

Key Theme: Harmony between agriculture and the environment

- a. Brief description of activity – Farm pond management educational activities have been conducted to focus on the key management areas of proper fertilizing, liming, and fish population management for successful recreational fishing. The urban and community fishing program for central and southeast Arkansas enhanced fishing opportunities, increased knowledge of fishing techniques and aquatic resource stewardship values, and increased local community involvement in the creation and enhancement of fishing opportunities. Studies were completed to determine angler demographics, participation, and attitudes towards recreational fishing at community-fishing ponds in Little Rock and Pine Bluff, Arkansas.

Furthermore, the annual evaluation was conducted of the Arkansas Game and Fish Commission's Hooked On Fishing - Not On Drugs Program in Arkansas.

- b. Impact(s) – In all, there were 27 different farm pond programs presented in 2002. Total contacts related to farm pond management were over 1,000 in 2002. Many individuals indicated that they were planning changes in the way that they managed their ponds as a result of the new information on proper management procedures. Given the large number of farm ponds in the state, the potential impact of improving farm pond management is high.

African-Americans represented 69% of the anglers in Pine Bluff and 78% in Little Rock. The majority of anglers traveled less than 5 miles to fish. Although variable between locations, the majority of anglers preferred to catch channel catfish followed by bluegill, largemouth bass, and crappie. While satisfaction with fishing success was poor, most anglers rated their fishing-trip experience as good.

- c. Scope of impact – State/National

- d. CSREES Funding – **\$54,801**
State Matching – **\$42,905**
Other Funding – **\$41,287**

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EVALUATION OF THE SUCCESS OF MULTI AND JOINT ACTIVITIES

Many of the research and extension programs of the UAPB Aquaculture/Fisheries Center involve multi-state and joint activities. The effort to evaluate the feasibility of alternative treatment options for effluents from catfish and baitfish effluents has involved a number of different states and universities. The multi-state approach has afforded all participants the opportunity to compare success and problem across states. The work to develop Best Management Practices has been a national, multi-state effort. Given the magnitude of the potential impact of EPA's actions, this national effort has enabled all project participants to take advantage of the research, experience, and insights of others across the U.S. who have had to deal with a variety of different regulatory options and positions. The collective progress of all has been enhanced by this coordinated effort.

The UAPB baitfish research program is a multi-disciplinary effort that has worked well. The successful finding that improved nutrition of baitfish broodstock allows for an extended spawning period and healthier fish was the combination of hatchery management, nutrition and fish health expertise. This successful multidisciplinary work has led to additional studies to look at the interactions among nutrition, fish health, and reproductive success for baitfish production.

The in-pond grader developed at UAPB has been tested in three different states under different conditions and with different species of fish. The results of tests in different locations under different conditions has allowed for a more complete evaluation and refinement of the grading technology.

The fish disease diagnostics program collaborates with similar diagnostics programs throughout the United States. The digital capabilities of the UAPB program allow for real-time consultations with other fish pathologists across the country.

INTEGRATED RESEARCH EXTENSION ACTIVITIES

The majority of the research extension activities of the Aquaculture/Fisheries Center are integrated research and extension activities. Under the planned programs related to Catfish Production and Management, the following are integrated activities:

1. Economics of producing different sizes of catfish stockers on growth farms.
2. Economics of alternative treatment options for effluents from catfish ponds.
3. Development of in-pond grading technology for commercial aquaculture.
4. Fish disease research and diagnostics.

Under the programs related to Baitfish Production and Management, the following are integrated activities:

1. Minimizing effluents from baitfish farms.
2. Development of baitfish hatcheries.
3. Fish disease research and diagnostics.

The ability of these programs to have a rapid and effective impact and to be adopted quickly by fish farmers is directly related to the fact that these were developed with an integrated research and extension approach. An individual with a joint extension-research appointment heads each of these projects. This type of appointment makes it very easy for an activity to become both a research endeavor and extension activity to implement those components of the research recommendations as quickly as they are completed.

**Summary of Expenditures (FY 2002)
(October 1, 2001 – September 30, 2002)**

**1890 Research and Extension Programs
University of Arkansas at Pine Bluff
3/1/2003**

	CSREES	STATE	OTHER	TOTAL
GOAL 1. An agricultural system that is highly competence in a global society				
Research Programs				
1. Poultry production and management	Terminated			
Research SYs				
2. Crop protection systems	83,289	27,890		111,179
Research SYs	1.5	.5		2.0
3. Alternative crop production	197,306	66,067		263,373
Research SYs	2.5	.7		3.2
4. Catfish production and management	340,205	122,674	180,746	643,625
Research SYs	7.7	4.4		12.1
5. Baitfish production and management	325,110	177,937	221,491	724,538
Research SYs	8.0	5.0		13.0
Expenditure Total	945,910	394,568	402,237	1,742,715
SYs Total	19.7	10.6		30.3
Extension Programs				
1. Small farm/Horticulture management	204,289	133,970		338,259
Extension FTEs	3.1	2.6		5.7
2. Livestock management	163,289	66,985		230,274
Extension FTEs	2.9	2.6		5.5
3. Catfish production/management	238,993	115,835	148,037	502,865
Extension FTEs	5.0	5.0		10.0
4. Baitfish production/management	213,623	81,151	176,637	471,411
Extension FTEs	4.7	4.0		8.7
Expenditure Total	820,194	397,941	324,674	1,542,809
FTEs Total	15.7	14.2		29.9

	CSREES	STATE	OTHER	TOTAL
GOAL 2. A safe and secure food and fiber system				
Research Programs N/A				
Extension Program				
5. Nutrition education and wellness system (Food Safety)	2,500	46,010	46,010	94,520
Extension FTEs		.34	1.15	1.49
Expenditure Total	2,500	46,010	46,010	94,520
FTEs Total		.34	1.15	1.49
GOAL 3. A healthy, well-nourished population				
Research Programs				
6. Herbs and vegetable production	143,830	48,161		191,991
Research SYs	1.9	.5		2.4
7. Human nutrition and health	99,322			99,322
Research SYs	1.4			1.4
Expenditure Total	243,152	48,161		291,313
SYs Total	3.3	.5		3.8
Extension Program				
5. Nutrition education and wellness system (Diet and Health)	7,500	138,028	138,028	283,556
Extension FTEs		1.01	3.45	4.46
Expenditure Total	7,500	138,028	138,028	283,556
FTEs Total		1.01	3.45	4.46
GOAL 4. An agricultural system which protects natural resources and the environment				
Research Programs				
8. Integrated pest management	98,767	33,072		131,839
Research Sys	1.9	.5		2.4
9. Small ruminant nutrition/management	103,580	34,684		138,264
Research Sys	2.6	.5		3.1
Expenditure Total	202,347	67,756		270,103
SYs Total	4.5	1.0		5.5
	CSREES	STATE	OTHER	TOTAL

Extension Program				
6. Farm pond management and irrigation reservoirs	54,801	42,905	41,287	138,993
Extension FTEs	2.6	2.0		4.6
Expenditure Total	54,801	42,905	41,287	138,993
FTEs Total	2.6	2.0		4.6
GOAL 5. Enhanced economic opportunity and quality of life of Americans				
Research Programs				
10. Economic behavior of minority farmers	93,221	31,214		124,435
Research Sys	2.4	.5		2.9
11. Improving quality of life	86,545	28,978		115,523
Research Sys	2.0	.5		2.5
Expenditure Total	179,766	60,192		239,958
SYs Total	4.4	1.0		5.4
Extension Program				
7. Family and youth programs Young Scholars Program, 1890 Adolescent Pregnancy Prevention Program, Parenting Education Program	344,647	115,715	47,484	507,846
Extension FTEs	7.7	3.4		11.1
Expenditure Total	344,647	115,715	47,484	507,846
FTEs Total	7.7	3.4		11.1
EXTENDED TOTAL RESEARCH EXPENDITURE	1,571,175	570,677	402,237	2,544,089
EXTENDED TOTAL EXTENSION EXPENDITURE	1,229,642	740,599	597,483	2,567,724
GRAND TOTAL EXPENDITURE	2,800,817	1,311,276	999,720	5,111,813
TOTAL – RESEARCH SYs	31.9	13.1		45.0
TOTAL – EXTENSION FTEs	26.0	20.95	4.6	51.55